

## Airbag

### Technical Field

The invention relates to an airbag for a vehicle occupant restraint system.

### Background of the Invention

On inflation of an airbag, it can be advantageous if the airbag at first does not  
5 move in the direction to the vehicle occupant but towards the side instead. There  
are already proposals for controlling the unfolding direction of the airbag, for  
instance by deflecting the incoming gas by means of a fabric part in the airbag, as  
is described in DE 296 09 706. In another proposal disclosed in DE 200 09 816,  
10 the mid-section of the front wall of the airbag is attached to the back wall by  
fastening means. When the airbag is inflated, the fastening means are destroyed  
by the pressure or by the temperature of the gas flowing in.

### Brief Summary of the Invention

The object of the invention is to provide an airbag that reproducibly expands  
first in the direction of its side wall when it is inflated.

15 This is achieved in an airbag that comprises an airbag wall which has a front  
wall facing the occupant to be restrained, a back wall and a side wall. The front  
wall and the back wall are connected to each other by means of a detachable  
connection. This connection between the front wall and the back wall is severed  
by the unfolding of the side wall when the airbag is inflated. Since the front and  
20 back walls are connected to each other at the start of the inflation procedure, the  
side wall unfolds first. Only through the unfolding of the side wall is the  
connection severed, thus ensuring that, in any case, the airbag will first expand  
laterally.

Additional advantageous embodiments of the invention will be apparent from  
25 the subordinate claims.

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Brief Description of the Drawings

Figure 1 shows a longitudinal section through the airbag according to the invention in a state at the beginning of unfolding;

Figure 2 shows a longitudinal section through the airbag of Figure 1 in a state  
5 during unfolding;

Figure 3 shows a longitudinal section through the airbag of Figure 2 in a completely unfolded state;

Figure 4 shows a cross-section through the airbag of Figure 1;

Figure 5 shows a cross-section through the airbag of Figure 2;

10 Figure 6 shows a cross-section through the airbag of Figure 3.

Detailed Description of the Preferred Embodiments

The airbag 10 according to the invention has an airbag wall with a front wall 14, a back wall 16 and a side wall 18. Figures 1 through 3 show the airbag 10 in three consecutive phases of the unfolding procedure, namely, in a schematic longitudinal section along a plane perpendicular to the front wall 14. The front wall 14 faces the occupant to be restrained; it faces upwards in Figures 1 through 3. The back wall 16 is connected to a gas generator 20 that generates the gas for inflating the airbag 10. Figures 4 through 6 show the airbag 10 in the same phases of the inflation procedure as in Figures 1 through 3, but in a schematic cross-section in a plane that is essentially parallel to the front wall 14. Here, the front wall 14 faces the observer and is depicted transparently in order to make the components located on the inside of the airbag 10 visible.  
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As can be seen in Figures 4 through 6, on the inside of the back wall 16, there are provided two parallel rows of loops 22, each in the form of elongated cylindrical spirals 24. On the inside of the front wall 14, there are likewise provided two spirals 24' with loops 22'. In this arrangement, the loops 22' of the  
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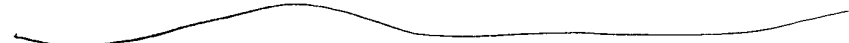
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spirals 24' engage in the interstices between the loops 22 of the spirals 24 on the back wall 16. In this manner, the loops 22 and 22' of each intermeshed pair of spirals 24, 24' enclose a cylindrical cavity into which a traction cable 26 is threaded. Thus, the traction cable forms a latching element for connecting the  
5 loops 22 and 22'. One end of each traction cable 26 is attached to the side wall 18, while the other end is left free. Therefore, at first, the front wall 14 is securely attached to the back wall 16.

When the airbag is inflated, the side wall 18 unfolds first since the incoming air cannot separate the front wall 14 from the back wall 16, as a result of which  
10 the airbag 10 first expands towards the sides (Figures 1 and 4, respectively). As a result of the unfolding of the side wall 18, however, the traction cable 26 is gradually pulled out of the loops 22, 22' (Figures 2 and 5, respectively). When the traction cable 26 is pulled completely out of the loops 22, 22' of the spirals 24,  
15 24', the connection between the front wall 14 and the back wall 16 is severed, so that the airbag 10 can also unfold in the direction to the vehicle occupant so as to reach its full size (Figures 3 and 6, respectively).

In contrast to tear seams, with the loop connection according to the invention, there is no risk that the connection between the front wall 14 and the back wall 16 will be severed prematurely, for instance due to the flow pressure of the incoming  
20 gas.

Of course, the arrangement of the spirals 24, 24' shown here is only an example. Other suitable arrangements can also bring about different unfolding shapes of the airbag 10, for example, horseshoe or ring-shaped arrangements.



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